REMARKS

Claims 24-38 are all the claims pending in the application. Claims 30 and 36 stand objected to only as being dependent upon a rejected base claim, and would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims. Therefore, claims 30 and 36 have been rewritten in independent form.

Claims 24-29, 31-35 and 37-38 stand rejected under 35 U.S.C. §102(b) as being anticipated by Lee, et al. ("Super Self-Aligned Double-Gate (SSDG) Mosfets Utilizing Oxidation Rate Difference An Selective Epitaxy", IEEE, 1999, Pages 71-74), hereinafter referred to as Lee. Applicants respectfully traverse these rejections based on the following discussion.

The Office Action argues that Lee discloses that the gate material of both the bottom and top gates is polysilicon and that the spacer is silicon oxide and that, therefore, the spacer material is independent of the material of the top and bottom gate. In other words, the Office Action appears to argue that because silicon oxide and polysilicon are different variants of silicon, that they are independent of one another. However, Applicants respectfully disagree because independent claim 24 defines that the materials are "independent" of one another which requires a showing of more than two different variants of the same material. In other words, by claiming that one material is "independent" of another material, this requires that the materials not have any commonality. In Lee, the material is polysilicon and silicon oxide had a commonality in the material silicon. Further, because Lee forms the spacers as an oxide of the gate material, the spacers will always have a commonality (or be dependent upon) the material of the gate. This is

different than what the independent claim 24 defines, because independent claim 24 requires that the materials be "independent" of one another (have no commonality). The materials used in Lee, and the processing which Lee discloses, make the spacers dependent upon the material of the gate. Thus, it is Applicants position that Lee does not meet the claim language of independent claim 24 where it states that "said spacers comprise a material that is independent of the material of said top gate and said bottom gate" because Lee discloses a process where the spacers are formed as oxides of the gate material and were Lee specifies that the gate material and the spacers have a commonality (silicon).

Lee forms the sidewall spacers between the gates and the source and drain by oxidation of the gates. This is the key to Lee's technique as stated in the Figure caption of Fig. 1 when describing the sidewall formation: "(d) Isolation oxide growth and timed etch. Utilization of oxidation rate difference in this step is the key idea." This implies that the sidewall spacers are basically the oxidized gate material. For example, if the gate material is polysilicon, the sidewalls spacers formed by oxidation of polysilicon will be SiO_2.

Lee's approach has the following disadvantages: First, one is always limited to the gate material oxide. So in the previous example, a sidewall spacer such of Si_3N_4 cannot be formed since there is no gate material that will oxidize into Si_3N_4. But even more problematic is that not all gate materials oxidized (i.e. form an oxide). As an example some metal will not oxidize, or form a volatile oxide. This is also true for many semiconductors. For example Ge oxide is volatile in water. With the invention, the sidewall spacer is independent of the gate material as stated in claim 24 since it is formed by a deposition.

Lee teaches that the gate sidewalls should be an oxide growth, which requires that the sidewalls comprise an oxidized form of the gate material. Thus, with Lee, the gate sidewall spacers are dependent upon the material of the gate itself and Lee does not teach that "said spacers comprise a material that is independent of the material of said top gate and said bottom gate" as defined by independent claim 24.

The Office Action states that in Lee, the gate material is a polysilicon while the spacer is silicon oxide. This statement demonstrates that the spacer material in Lee is not independent of the gate material because both are silicon based. Following the teachings of Lee requires that the spacers be an oxide of the gate material and therefore, the spacers must be dependent upon the gate material. To the contrary, with the claimed invention, the spacer material could comprise any insulator (such as a deposited insulator), while the gate material could comprise any form of conductor such as a metal, polysilicon, etc.

The last five lines of the first column of page 3.5.1 of Lee explain that by utilizing the oxidation rate difference between the two poly gates and the lightly doped channel region, Lee can grow a much thicker isolation oxide on the side wall of the poly gates, as shown in Figure (d) of Lee. This gives the structure in Lee the unique shape where the isolation oxide is thicker adjacent the upper and lower gates and is narrower near the channel region silicon film. Therefore, the disclosure in Lee requires that the spacers adjacent the gate conductors be an oxide of the gate material. Thus, Lee requires that the spacers be depended upon the material makeup of the upper and lower gates. This is directly contrary to the claimed invention where "said spacers comprise a material that is independent of the material of said top gate and said bottom

gate" as defined by independent claim 24.

Because the inventive process uses the sacrificial nitride layers 310, 312, 305 and replaces the sacrificial layers with the upper and lower gates 502, 503, the material selection for the spacers 314, 307 is completely independent of the material selection of the upper and lower gates 502, 503. To the contrary, the structure disclosed in Lee is most clearly seen in Figure 1f which illustrates a top gate and a bottom gate separated by a channel region, with a continuous oxide separating the gates from the source and drain regions.

With respect to claim 29, the Office Action suggests that Lee teaches "spacers comprise lower spacers adjacent a lower section of said top gate and upper spacers adjacent an upper section of said top gate." Lee's figure 1d and 1e clearly show the spacers adjacent to the top gate are homogeneous and are not formed of two portions. Applicants disclose spacers comprising of a lower portion 307 and an upper portion 1200 as clearly indicated in Fig. 11 of the application. Lee's spacers are formed by a simple oxidation of the gates and they consist of a uniform homogeneous oxide. In contrast, spacer portion 307 and 1200 can be of different materials and have different thicknesses.

As shown in Applicants' Figure 11, because the inventive process forms the spacers 307, 1200 that are adjacent to the top gate 502 in separate processing steps, the inventive structure includes distinct upper and lower spacers adjacent the top gate. The Office Action argues that Figure (e) of Lee discloses the difference spacers adjacent the upper gate. The only structures in Figure (e) of Lee that have some difference in the vicinity of the upper gate appear to be the selective epitaxy regions. However, these selective epitaxy regions are not adjacent to the gate in

Lee, but instead the uniform oxide spacers are adjacent the upper gate in Lee. Therefore, it is improper to equate the claimed spacers with the selective epitaxy described in Figure (e) of Lee. To the contrary, Lee only discloses a single continuous oxide spacer adjacent the top gate. Thus, Lee cannot teach or suggest "spacers in direct contact with said top gate, wherein said spacers comprise lower spacers in direct contact with a lower section of said top gate and upper spacers in direct contact with an upper section of said top gate, wherein said lower spacers are different than said upper spacers" as defined by independent claims 29 and 35.

Further, because the invention utilizes a self aligned silicide process, the inventive structure includes silicide regions 1300 that are adjacent the point where the upper spacers 1200 and the lower spacers 307 meet. Once again, because Lee teaches a single continuous spacer along the sidewalls of the top gate, it cannot teach or suggest claimed invention where "said silicide regions are adjacent a point where said upper spacers meet said lower spacers" as defined by independent claim 35.

Therefore, as shown above, the applied prior art reference Lee does not teach or suggest the invention defined by independent claims 24, 29, and 35. Therefore, the independent claims (and the dependent claims 25-28, 30-34, and 36-38 by their dependency) are patentable over Lee. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

II. Formal Matters and Conclusion

In view of the foregoing, Applicants submit that claims 24-38, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 50-0510.

Respectfully submitted,

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